



SEQUENCE LISTING

<110> Galloway, Darrel
Mateczun, Alfred

<120> Methods for Protection Against Lethal Infection with Bacillus Anthracis

<130> 22727/04079

<140> 09/747,521

<141> 2000-12-21

<160> 8

<170> PatentIn version 3.0

<210> 1

<211> 2430

<212> DNA

<213> Bacillus anthracis

<220>

<221> CDS

<222> (1)..(2430)

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96

Val Thr Ala Ile Thr Leu Ser Gly Pro Val Phe Ile Pro Leu Val Gln

20 25 30

ggg gcg ggc ggt cat ggt gat gta ggt atg cac gta aaa gag aaa gag
144

Gly Ala Gly Gly His Gly Asp Val Gly Met His Val Lys Glu Lys Glu

35 40 45

09747521.042601

aaa aat aaa gat gag aat aag aga aaa gat gaa gaa cga aat aaa aca
192

Lys Asn Lys Asp Glu Asn Lys Arg Lys Asp Glu Glu Arg Asn Lys Thr

50

55

60

cag gaa gag cat tta aag gaa atc atg aaa cac att gta aaa ata gaa
240

Gln Glu Glu His Leu Lys Glu Ile Met Lys His Ile Val Lys Ile Glu

65

70

75

80

gta aaa ggg gag gaa gct gtt aaa aaa gag gca gca gaa aag cta ctt
288

Val Lys Gly Glu Glu Ala Val Lys Lys Glu Ala Ala Glu Lys Leu Leu

85

90

95

gag aaa gta cca tct gat gtt tta gag atg tat aaa gca att gga gga
336

Glu Lys Val Pro Ser Asp Val Leu Glu Met Tyr Lys Ala Ile Gly Gly

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105

110

aag ata tat att gtg gat ggt gat att aca aaa cat ata tct tta gaa
384

Lys Ile Tyr Ile Val Asp Gly Asp Ile Thr Lys His Ile Ser Leu Glu

115

120

125

gca tta tct gaa gat aag aaa aaa ata aaa gac att tat ggg aaa gat
432

Ala Leu Ser Glu Asp Lys Lys Lys Ile Lys Asp Ile Tyr Gly Lys Asp

130

135

140

gct tta tta cat gaa cat tat gta tat gca aaa gaa gga tat gaa ccc
480

Ala Leu Leu His Glu His Tyr Val Tyr Ala Lys Glu Gly Tyr Glu Pro

145

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155

160

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165

170

175

gca ctg aac gtt tat tat gaa ata ggt aag ata tta tca agg gat att
576
Ala Leu Asn Val Tyr Tyr Glu Ile Gly Lys Ile Leu Ser Arg Asp Ile

180

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tta agt aaa att aat caa cca tat cag aaa ttt tta gat gta tta aat
624
Leu Ser Lys Ile Asn Gln Pro Tyr Gln Lys Phe Leu Asp Val Leu Asn

195

200

205

acc att aaa aat gca tct gat tca gat gga caa gat ctt tta ttt act
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caa aat agc aat gag gta caa gaa gta ttt gcg aaa gct ttt gca tat
768
Gln Asn Ser Asn Glu Val Gln Glu Val Phe Ala Lys Ala Phe Ala Tyr

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tat atc gag cca cag cat cgt gat gtt tta cag ctt tat gca ccg gaa
816
Tyr Ile Glu Pro Gln His Arg Asp Val Leu Gln Leu Tyr Ala Pro Glu

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gct ttt aat tac atg gat aaa ttt aac gaa caa gaa ata aat cta tcc
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Ala Phe Asn Tyr Met Asp Lys Phe Asn Glu Gln Glu Ile Asn Leu Ser

275

280

285

ttg gaa gaa ctt aaa gat caa cgg atg ctg tca aga tat gaa aaa tgg
912

Leu Glu Glu Leu Lys Asp Gln Arg Met Leu Ser Arg Tyr Glu Lys Trp

290

295

300

gaa aag ata aaa cag cac tat caa cac tgg agc gat tct tta tct gaa
960

Glu Lys Ile Lys Gln His Tyr Gln His Trp Ser Asp Ser Leu Ser Glu

305

310

315

320

gaa gga aga gga ctt tta aaa aag ctg cag att cct att gag cca aag
1008

Glu Gly Arg Gly Leu Leu Lys Lys Leu Gln Ile Pro Ile Glu Pro Lys

325

330

335

aaa gat gac ata att cat tct tta tct caa gaa gaa aaa gag ctt cta
1056

Lys Asp Asp Ile Ile His Ser Leu Ser Gln Glu Glu Lys Glu Leu Leu

340

345

350

aaa aga ata caa att gat agt agt gat ttt tta tct act gag gaa aaa
1104

Lys Arg Ile Gln Ile Asp Ser Ser Asp Phe Leu Ser Thr Glu Glu Lys

355

360

365

gag ttt tta aaa aag cta caa att gat att cgt gat tct tta tct gaa
1152

Glu Phe Leu Lys Lys Leu Gln Ile Asp Ile Arg Asp Ser Leu Ser Glu

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370

375

380

gaa gaa aaa gag ctt tta aat aga ata cag gtg gat agt agt aat cct
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Glu Glu Lys Glu Leu Leu Asn Arg Ile Gln Val Asp Ser Ser Asn Pro

385

390

395

400

tta tct gaa aaa gaa aaa gag ttt tta aaa aag ctg aaa ctt gat att
1248

Leu Ser Glu Lys Glu Lys Glu Phe Leu Lys Lys Leu Lys Leu Asp Ile

405

410

415

caa cca tat gat att aat caa agg ttg caa gat aca gga ggg tta att
1296

Gln Pro Tyr Asp Ile Asn Gln Arg Leu Gln Asp Thr Gly Gly Leu Ile

420

425

430

gat agt ccg tca att aat ctt gat gta aga aag cag tat aaa agg gat
1344

Asp Ser Pro Ser Ile Asn Leu Asp Val Arg Lys Gln Tyr Lys Arg Asp

435

440

445

att caa aat att gat gct tta tta cat caa tcc att gga agt acc ttg
1392

Ile Gln Asn Ile Asp Ala Leu Leu His Gln Ser Ile Gly Ser Thr Leu

450

455

460

tac aat aaa att tat ttg tat gaa aat atg aat atc aat aac ctt aca
1440

Tyr Asn Lys Ile Tyr Leu Tyr Glu Asn Met Asn Ile Asn Asn Leu Thr

465

470

475

480

gca acc cta ggt gcg gat tta gtt gat tcc act gat aat act aaa att
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Ala Thr Leu Gly Ala Asp Leu Val Asp Ser Thr Asp Asn Thr Lys Ile

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T09240.T25

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aat aga ggt att ttc aat gaa ttc aaa aaa aat ttc aaa tat agt att
1536

Asn Arg Gly Ile Phe Asn Glu Phe Lys Lys Asn Phe Lys Tyr Ser Ile

500

505

510

tct agt aac tat atg att gtt gat ata aat gaa agg cct gca tta gat
1584

Ser Ser Asn Tyr Met Ile Val Asp Ile Asn Glu Arg Pro Ala Leu Asp

515

520

525

aat gag cgt ttg aaa tgg aga atc caa tta tca cca gat act cga gca
1632

Asn Glu Arg Leu Lys Trp Arg Ile Gln Leu Ser Pro Asp Thr Arg Ala

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535

540

gga tat tta gaa aat gga aag ctt ata tta caa aga aac atc ggt ctg
1680

Gly Tyr Leu Glu Asn Gly Lys Leu Ile Leu Gln Arg Asn Ile Gly Leu

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550

555

560

gaa ata aag gat gta caa ata att aag caa tcc gaa aaa gaa tat ata
1728

Glu Ile Lys Asp Val Gln Ile Ile Lys Gln Ser Glu Lys Glu Tyr Ile

565

570

575

agg att gat gcg aaa gta gtg cca aag agt aaa ata gat aca aaa att
1776

Arg Ile Asp Ala Lys Val Val Pro Lys Ser Lys Ile Asp Thr Lys Ile

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585

590

caa gaa gca cag tta aat ata aat cag gaa tgg aat aaa gca tta ggg
1824

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tta cca aaa tat aca aag' ctt att aca ttc aac gtg cat aat aga tat
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 Leu Pro Lys Tyr Thr Lys Leu Ile Thr Phe Asn Val His Asn Arg Tyr
 610 615 620

gca tcc aat att gta gaa agt gct tat tta ata ttg aat gaa tgg aaa
 1920
 Ala Ser Asn Ile Val Glu Ser Ala Tyr Leu Ile Leu Asn Glu Trp Lys
 625 630 635 640

aat aat att caa agt gat ctt ata aaa aag gta aca aat tac tta gtt
 1968
 Asn Asn Ile Gln Ser Asp Leu Ile Lys Lys Val Thr Asn Tyr Leu Val
 645 650 655

gat ggt aat gga aga ttt gtt ttt acc gat att act ctc cct aat ata
 2016
 Asp Gly Asn Gly Arg Phe Val Phe Thr Asp Ile Thr Leu Pro Asn Ile
 660 665 670

gct gaa caa tat aca cat caa gat gag ata tat gag caa gtt cat tca
 2064
 Ala Glu Gln Tyr Thr His Gln Asp Glu Ile Tyr Glu Gln Val His Ser
 675 680 685

aaa ggg tta tat gtt cca gaa tcc cgt tct ata tta ctc cat gga cct
 2112
 Lys Gly Leu Tyr Val Pro Glu Ser Arg Ser Ile Leu Leu His Gly Pro
 690 695 700

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2160

Ser Lys Gly Val Glu Leu Arg Asn Asp Ser Glu Gly Phe Ile His Glu

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710

715

720

ttt gga cat gct gtg gat gat tat gct gga tat cta tta gat aag aac

2208

Phe Gly His Ala Val Asp Asp Tyr Ala Gly Tyr Leu Leu Asp Lys Asn

725

730

735

caa tct gat tta gtt aca aat tct aaa aaa ttc att gat att ttt aag

2256

Gln Ser Asp Leu Val Thr Asn Ser Lys Lys Phe Ile Asp Ile Phe Lys

740

745

750

gaa gaa ggg agt aat tta act tcg tat ggg aga aca aat gaa gcg gaa

2304

Glu Glu Gly Ser Asn Leu Thr Ser Tyr Gly Arg Thr Asn Glu Ala Glu

755

760

765

ttt ttt gca gaa gcc ttt agg tta atg cat tct acg gac cat gct gaa

2352

Phe Phe Ala Glu Ala Phe Arg Leu Met His Ser Thr Asp His Ala Glu

770

775

780

cgt tta aaa gtt caa aaa aat gct ccg aaa act ttc caa ttt att aac

2400

Arg Leu Lys Val Gln Lys Asn Ala Pro Lys Thr Phe Gln Phe Ile Asn

785

790

795

800

gat cag att aag ttc att att aac tca taa

2430

Asp Gln Ile Lys Phe Ile Ile Asn Ser

805

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Gly Ala Gly Gly His Gly Asp Val Gly Met His Val Lys Glu Lys Glu
 35 40 45

Lys Asn Lys Asp Glu Asn Lys Arg Lys Asp Glu Glu Arg Asn Lys Thr
 50 55 60

Gln Glu Glu His Leu Lys Glu Ile Met Lys His Ile Val Lys Ile Glu
 65 70 75 80

Val Lys Gly Glu Glu Ala Val Lys Lys Glu Ala Ala Glu Lys Leu Leu
 85 90 95

Glu Lys Val Pro Ser Asp Val Leu Glu Met Tyr Lys Ala Ile Gly Gly
 100 105 110

Lys Ile Tyr Ile Val Asp Gly Asp Ile Thr Lys His Ile Ser Leu Glu
 115 120 125

Ala Leu Ser Glu Asp Lys Lys Lys Ile Lys Asp Ile Tyr Gly Lys Asp
 130 135 140

Ala Leu Leu His Glu His Tyr Val Tyr Ala Lys Glu Gly Tyr Glu Pro
 145 150 155 160

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Val Leu Val Ile Gln Ser Ser Glu Asp Tyr Val Glu Asn Thr Glu Lys
165 170 175

Ala Leu Asn Val Tyr Tyr Glu Ile Gly Lys Ile Leu Ser Arg Asp Ile
180 185 190

Leu Ser Lys Ile Asn Gln Pro Tyr Gln Lys Phe Leu Asp Val Leu Asn
195 200 205

Thr Ile Lys Asn Ala Ser Asp Ser Asp Gly Gln Asp Leu Leu Phe Thr
210 215 220

Asn Gln Leu Lys Glu His Pro Thr Asp Phe Ser Val Glu Phe Leu Glu
225 230 235 240

Gln Asn Ser Asn Glu Val Gln Glu Val Phe Ala Lys Ala Phe Ala Tyr
245 250 255

Tyr Ile Glu Pro Gln His Arg Asp Val Leu Gln Leu Tyr Ala Pro Glu
260 265 270

Ala Phe Asn Tyr Met Asp Lys Phe Asn Glu Gln Glu Ile Asn Leu Ser
275 280 285

Leu Glu Glu Leu Lys Asp Gln Arg Met Leu Ser Arg Tyr Glu Lys Trp
290 295 300

Glu Lys Ile Lys Gln His Tyr Gln His Trp Ser Asp Ser Leu Ser Glu
305 310 315 320

Glu Gly Arg Gly Leu Leu Lys Lys Leu Gln Ile Pro Ile Glu Pro Lys
325 330 335

Lys Asp Asp Ile Ile His Ser Leu Ser Gln Glu Glu Lys Glu Leu Leu
340 345 350

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 370 375 380

Glu Glu Lys Glu Leu Leu Asn Arg Ile Gln Val Asp Ser Ser Asn Pro
 385 390 395 400

Leu Ser Glu Lys Glu Lys Glu Phe Leu Lys Lys Leu Lys Leu Asp Ile
 405 410 415

Gln Pro Tyr Asp Ile Asn Gln Arg Leu Gln Asp Thr Gly Gly Leu Ile
 420 425 430

Asp Ser Pro Ser Ile Asn Leu Asp Val Arg Lys Gln Tyr Lys Arg Asp
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Ile Gln Asn Ile Asp Ala Leu Leu His Gln Ser Ile Gly Ser Thr Leu
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Tyr Asn Lys Ile Tyr Leu Tyr Glu Asn Met Asn Ile Asn Asn Leu Thr
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Ala Thr Leu Gly Ala Asp Leu Val Asp Ser Thr Asp Asn Thr Lys Ile
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Asn Arg Gly Ile Phe Asn Glu Phe Lys Lys Asn Phe Lys Tyr Ser Ile
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Ser Ser Asn Tyr Met Ile Val Asp Ile Asn Glu Arg Pro Ala Leu Asp
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Asn Glu Arg Leu Lys Trp Arg Ile Gln Leu Ser Pro Asp Thr Arg Ala
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Gly Tyr Leu Glu Asn Gly Lys Leu Ile Leu Gln Arg Asn Ile Gly Leu
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565 570 575

Arg Ile Asp Ala Lys Val Val Pro Lys Ser Lys Ile Asp Thr Lys Ile
580 585 590

Gln Glu Ala Gln Leu Asn Ile Asn Gln Glu Trp Asn Lys Ala Leu Gly
595 600 605

Leu Pro Lys Tyr Thr Lys Leu Ile Thr Phe Asn Val His Asn Arg Tyr
610 615 620

Ala Ser Asn Ile Val Glu Ser Ala Tyr Leu Ile Leu Asn Glu Trp Lys
625 630 635 640

Asn Asn Ile Gln Ser Asp Leu Ile Lys Lys Val Thr Asn Tyr Leu Val
645 650 655

Asp Gly Asn Gly Arg Phe Val Phe Thr Asp Ile Thr Leu Pro Asn Ile
660 665 670

Ala Glu Gln Tyr Thr His Gln Asp Glu Ile Tyr Glu Gln Val His Ser
675 680 685

Lys Gly Leu Tyr Val Pro Glu Ser Arg Ser Ile Leu Leu His Gly Pro
690 695 700

Ser Lys Gly Val Glu Leu Arg Asn Asp Ser Glu Gly Phe Ile His Glu
705 710 715 720

Phe Gly His Ala Val Asp Asp Tyr Ala Gly Tyr Leu Leu Asp Lys Asn
725 730 735

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Gln Ser Asp Leu Val Thr Asn Ser Lys Lys Phe Ile Asp Ile Phe Lys
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Glu Glu Gly Ser Asn Leu Thr Ser Tyr Gly Arg Thr Asn Glu Ala Glu
 755 760 765

Phe Phe Ala Glu Ala Phe Arg Leu Met His Ser Thr Asp His Ala Glu
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Arg Leu Lys Val Gln Lys Asn Ala Pro Lys Thr Phe Gln Phe Ile Asn
 785 790 795 800

Asp Gln Ile Lys Phe Ile Ile Asn Ser
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 1 5 10 15

tta gtt tca agc aca ggt aat tta gag gtg att cag gca gaa gtt aaa
 96
 Leu Val Ser Ser Thr Gly Asn Leu Glu Val Ile Gln Ala Glu Val Lys
 20 25 30

cag gag aac cgg tta tta aat gaa tca gaa tca agt tcc cag ggg tta
 144
 Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser Gln Gly Leu

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35

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192

Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro Met Val Val

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55

60

acc tct tct act aca ggg gat tta tct att cct agt tct gag tta gaa
240

Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser Glu Leu Glu

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80

aat att cca tcg gaa aac caa tat ttt caa tct gct att tgg tca gga
288

Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile Trp Ser Gly

85

90

95

ttt atc aaa gtt aag aag agt gat gaa tat aca ttt gct act tcc gct
336

Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala Thr Ser Ala

100

105

110

gat aat cat gta aca atg tgg gta gat gac caa gaa gtg att aat aaa
384

Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val Ile Asn Lys

115

120

125

gct tct aat tct aac aaa atc aga tta gaa aaa gga aga tta tat caa
432

Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg Leu Tyr Gln

130

135

140

ata aaa att caa tat caa cga gaa aat cct act gaa aaa gga ttg gat
480

Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys Gly Leu Asp

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145 150 155 160

ttc aag ttg tac tgg acc gat tct caa aat aaa aaa gaa gtg att tct
528

Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu Val Ile Ser

165 170 175

agt gat aac tta caa ttg cca gaa tta aaa caa aaa tct tcg aac tca
576

Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser Ser Asn Ser

180 185 190

aga aaa aag cga agt aca agt gct gga cct acg gtt cca gac cgt gac
624

Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro Asp Arg Asp

195 200 205

aat gat gga atc cct gat tca tta gag gta gaa gga tat acg gtt gat
672

Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr Thr Val Asp

210 215 220

gtc aaa aat aaa aga act ttt ctt tca cca tgg att tct aat att cat
720

Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser Asn Ile His

225 230 235 240

gaa aag aaa gga tta acc aaa tat aaa tca tct cct gaa aaa tgg agc
768

Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu Lys Trp Ser

245 250 255

acg gct tct gat ccg tac agt gat ttc gaa aag gtt aca gga cgg att.
816

Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr Gly Arg Ile

260

265

270

gat aag aat gta tca cca gag gca aga cac ccc ctt gtg gca gct tat

864

Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val Ala Ala Tyr

275

280

285

ccg att gta cat gta gat atg gag aat att att ctc tca aaa aat gag

912

Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser Lys Asn Glu

290

295

300

gat caa tcc aca cag aat act gat agt gaa acg aga aca ata agt aaa

960

Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr Ile Ser Lys

305

310

315

320

aat act tct aca agt agg aca cat act agt gaa gta cat gga aat gca

1008

Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His Gly Asn Ala

325

330

335

gaa gtg cat gcg aat act tct aca agt agg aca cat act agt gaa gta

1056

Glu Val His Ala Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val

340

345

350

cat gga aat gca gaa gtg cat gcg gtc gca att gat cat tca cta tct

1104

His Gly Asn Ala Glu Val His Ala Val Ala Ile Asp His Ser Leu Ser

355

360

365

cta gca ggg gaa aga act tgg gct gaa aca atg ggt tta aat acc gct

09747531.042601

1152

Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu Asn Thr Ala

370

375

380

gat aca gca aga tta aat gcc aat att aga tat gta aat act ggg acg

1200

Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn Thr Gly Thr

385

390

395

400

gct cca atc tac aac gtg tta cca acg act tcg tta gtg tta gga aaa

1248

Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val Leu Gly Lys

405

410

415

aat caa aca ctc gcg aca att aaa gct aag gaa aac caa tta agt caa

1296

Asn Gln Thr Leu Ala Thr Ile Lys Ala Lys Glu Asn Gln Leu Ser Gln

420

425

430

ata ctt gca cct aat aat tat tat cct tct aaa aac ttg gcg cca atc

1344

Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu Ala Pro Ile

435

440

445

gca tta aat gca caa gac gat ttc agt tct act cca att aca atg aat

1392

Ala Leu Asn Ala Gln Asp Asp Phe Ser Ser Thr Pro Ile Thr Met Asn

450

455

460

tac aat caa ttt ctt gag tta gaa aaa acg aaa caa tta aga tta gat

1440

Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu Arg Leu Asp

465

470

475

480

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acg gat caa gta tat ggg aat ata gca aca tac aat ttt gaa aat gga
1488

Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe Glu Asn Gly

485

490

495

aga gtg agg gtg gat aca ggc tcg aac tgg agt gaa gtg tta ccg caa
1536

Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val Leu Pro Gln

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505

510

att caa gaa aca act gca cgt atc att ttt aat gga aaa gat tta aat
1584

Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys Asp Leu Asn

515

520

525

ctg gta gaa agg cgg ata gcg gcg gtt aat cct agt gat cca tta gaa
1632

Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp Pro Leu Glu

530

535

540

acg act aaa ccg gat atg aca tta aaa gaa gcc ctt aaa ata gca ttt
1680

Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys Ile Ala Phe

545

550

555

560

gga ttt aac gaa ccg aat gga aac tta caa tat caa ggg aaa gac ata
1728

Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly Lys Asp Ile

565

570

575

acc gaa ttt gat ttt aat ttc gat caa caa aca tct caa aat atc aag
1776

Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln Asn Ile Lys

580

585

590

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1824

Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr Val Leu Asp

595

600

605

aaa atc aaa tta aat gca aaa atg aat att tta ata aga gat aaa cgt
1872

Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg Asp Lys Arg

610

615

620

ttt cat tat gat aga aat aac ata gca gtt ggg gcg gat gag tca gta
1920

Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp Glu Ser Val

625

630

635

640

gtt aag gag gct cat aga gaa gta att aat tcg tca aca gag gga tta
1968

Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr Glu Gly Leu

645

650

655

ttg tta aat att gat aag gat ata aga aaa ata tta tca ggt tat att
2016

Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser Gly Tyr Ile

660

665

670

gta gaa att gaa gat act gaa ggg ctt aaa gaa gtt ata aat gac aga
2064

Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile Asn Asp Arg

675

680

685

tat gat atg ttg aat att tct agt tta cgg caa gat gga aaa aca ttt
2112

Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly Lys Thr Phe

690

695

700

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ata gat ttt aaa aaa tat aat gat aaa tta ccg tta tat ata agt aat
2160

Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr Ile Ser Asn

705 710 715 720

ccc aat tat aag gta aat gta tat gct gtt act aaa gaa aac act att
2208

Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu Asn Thr Ile

725 730 735

att aat cct agt gag aat ggg gat act agt acc aac ggg atc aag aaa
2256

Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly Ile Lys Lys

740 745 750

att tta atc ttt tct aaa aaa ggc tat gag ata gga taa
2295

Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly

755 760

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Leu Val Ser Ser Thr Gly Asn Leu Glu Val Ile Gln Ala Glu Val Lys
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Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser Gln Gly Leu
35 40 45

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Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro Met Val Val
50 55 60

Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser Glu Leu Glu
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Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile Trp Ser Gly
85 90 95

Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala Thr Ser Ala
100 105 110

Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val Ile Asn Lys
115 120 125

Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg Leu Tyr Gln
130 135 140

Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys Gly Leu Asp
145 150 155 160

Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu Val Ile Ser
165 170 175

Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser Ser Asn Ser
180 185 190

Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro Asp Arg Asp
195 200 205

Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr Thr Val Asp
210 215 220

Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser Asn Ile His
225 230 235 240

Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu Lys Trp Ser
245 250 255

Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr Gly Arg Ile
260 265 270

Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val Ala Ala Tyr
275 280 285

Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser Lys Asn Glu
290 295 300

Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr Ile Ser Lys
305 310 315 320

Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His Gly Asn Ala
325 330 335

Glu Val His Ala Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val
340 345 350

His Gly Asn Ala Glu Val His Ala Val Ala Ile Asp His Ser Leu Ser
355 360 365

Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu Asn Thr Ala
370 375 380

Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn Thr Gly Thr
385 390 395 400

Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val Leu Gly Lys
405 410 415

Asn Gln Thr Leu Ala Thr Ile Lys Ala Lys Glu Asn Gln Leu Ser Gln
420 425 430

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Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu Ala Pro Ile
 435 440 445

Ala Leu Asn Ala Gln Asp Asp Phe Ser Ser Thr Pro Ile Thr Met Asn
 450 455 460

Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu Arg Leu Asp
 465 470 475 480

Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe Glu Asn Gly
 485 490 495

Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val Leu Pro Gln
 500 505 510

Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys Asp Leu Asn
 515 520 525

Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp Pro Leu Glu
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Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys Ile Ala Phe
 545 550 555 560

Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly Lys Asp Ile
 565 570 575

Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln Asn Ile Lys
 580 585 590

Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr Val Leu Asp
 595 600 605

Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg Asp Lys Arg
 610 615 620

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Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp Glu Ser Val
625 630 635 640

Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr Glu Gly Leu
645 650 655

Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser Gly Tyr Ile
660 665 670

Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile Asn Asp Arg
675 680 685

Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly Lys Thr Phe
690 695 700

Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr Ile Ser Asn
705 710 715 720

Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu Asn Thr Ile
725 730 735

Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly Ile Lys Lys
740 745 750

Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly
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19

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26

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<400> 7
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15

<210> 8
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<400> 8
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15

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